Road & Bridge Design Publications

Monthly Update – January 2022

Revisions for the month of **January** are listed and displayed below and will be included in projects submitted for the **May** letting.

E-mail road related questions to MDOT-Road-Design-Standards@michigan.gov.
E-mail bridge related questions to MDOT-Bridge-Design-Standards@michigan.gov.

Special Details

R-43-J: Location of Transverse Joints in Plain Concrete Pavement: Revised the width of the sawed joints at the ends of structure from (½" x ¼") to (½" x ⅛") and referenced the bridge plans.

R-45-K: Pavement Reinforcement for Bridge Approach: On sheet one, added an offset from the edge of reinforcement to the edge of slab when the slab is adjacent to HMA pavement.

Road Design Manual

6.03.11K: Temporary Pavement Markings: Updated section to current practice, including revising pay items to match 2020 Standard Specifications for Construction, referencing the Work Zone Safety & Mobility Manual and the PAVE-904 series pavement marking standard, and updating the information on the wet reflective temporary pavement markings "R" and "NR".

6.05.04D: Widening Shoulder Paving in Guardrail Sections: Added offsets for MGS guardrail to the details.

6.06.16: Curb & Gutter for Erosion Control: Minor wording changes to eliminate outdated terminology. Also added an offset for MGS guardrail to the details.

Bridge Design Manual

7.03.01 B. 4. e. (LFD & LRFD): Updated pavement seat length to 9" and defined slab interaction for sliding slabs.

7.03.01 B. 4. f.-j. (LFD & LRFD): Section updated and clarified. Updates include:

Changes to bridge approach slab are a complete redesign.

An inverted "T" sleeper slab will be used with all integral and semi-integral bridges, regardless of road approach pavement type. On the road side of the inverted "T" sleeper slab stub, a Standard Plan R-45-Series pavement will be used and the joint at the far end of the slab will be made perpendicular to the roadway centerline (no skew) (See Standard Plan R-43- Series).

Road & Bridge Design Publications

Monthly Update – January 2022

Dependent backwalls will have a 9" pavement seat and the approach slab will be 12" minimum thickness. Bars are lapped or developed from bridge deck to approach slab verses the continuation of deck reinforcement.

7.07. 03 (LFD & LRFD): Added Guide references for bridge approach pavement.

12.07.03: Added language to document a more detailed decision making process for assessment and repair for pin and hanger structures.

Bridge Design Guides

Table of Contents: Deleted Guide 6.20.03C. Information combined with Guide 6.20.03B.

6.20.03A & 6.20.03B: An inverted "T" sleeper slab is used with all sliding slab independent backwall bridges, regardless of road approach pavement type. On the road side of the inverted "T" sleeper slab stub, a Standard Plan R-45-Series pavement will be used and the joint at the far end of the slab will be made perpendicular to the roadway centerline (no skew) (See Standard Plan R-43-Series). Acute corners at the reference line (joint) will have extra fanned reinforcement to prevent cracking. Polyethylene(2 layers) will be used as before but extend 2" onto the top of the backwall. Also updated pay items. The information on old Guides 6.30.02B and 6.20.03C has been combined into the new 6.20.03B.

6.20.04, 6.20.04B & 6.20.04C: An inverted "T" sleeper slab will be used with all integral and semi-integral bridges, regardless of road approach pavement type. On the road side of the inverted "T" sleeper slab stub, a Standard Plan R-45-Series pavement will be used and the joint at the far end of the slab will be made perpendicular to the roadway centerline (no skew) (See Standard Plan R-43-Series). Bridge approach slab reinforcement has been updated to smaller #4 bars with at tighter spacing. Changes to bridge approach slab are a complete redesign. Dependent backwalls will have a 9" pavement seat and the approach slab will be 12" minimum thickness. Bars are lapped or developed from bridge deck to approach slab verses the continuation of deck reinforcement. Polyethylene(2 layers) will be used as before but extend 2" onto the top of the backwall. Also updated pay item. On Guide 6.20.04, the highlight to the very right of the page deals with epoxy coated reinforcement for box beams and is related to previous month's update.

Updates to the MDOT Cell Library, Sample Plans, and other automated tools may be required in tandem with some of this month's updates. Until such updates can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

Index to Special Details

1-24-2022

⑥

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	4-9-18
24	8	GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8	9-28-18
99	2	CHAIN LINK FENCE WITH WIRE ROPE	9-22-14
R-15-G	3	COVER K	7-26-19
R-27-F	1	BRIDGE APPROACH CURB & GUTTER (USING EXISTING CATCH BASIN)	10-14-19
R-28-J	7	CURB RAMP AND DETECTABLE WARNING DETAILS	5-8-20
R-32-F	8	APPROACH CURB & GUTTER DOWNSPOUTS	10-7-20
R-32-SD	6	APPROACH CURB & GUTTER DOWNSPOUTS (FOR EXISTING RAILINGS)	11-14-19
R-33-G	2	CONCRETE VALLEY GUTTER AND URBAN FREEWAY CURB	8-14-19
*R-43-J	2	LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT	1-4-22
*R-45-K	2	PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH	1-4-22
R-53-A	22	TEMPORARY CONCRETE BARRIER LIMITED DEFLECTION	8-14-15
R-56-F	6	GUARDRAIL MEDIAN OBJECT PROTECTION	2-5-19
R-60-J	17	GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, & MGS-8D	12-3-21
R-62-H	4	GUARDRAIL APPROACH TERMINAL TYPE 2M	9-9-21
R-63-C	16	GUARDRAIL APPROACH TERMINAL TYPES 3B & 3T	2-5-19
R-66-E	4	GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS	9-28-18
R-67-G	16	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS	8-30-21
R-67-SD	7	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS (FOR EXISTING RAILINGS)	8-31-21
R-72-D	6	GUARDRAIL LONG SPAN INSTALLATIONS	3-4-20
R-73-F	3	GUARDRAIL OVER BOX OR SLAB CULVERTS	8-1-19
R-80-F	8	GRANULAR BLANKETS, UNDERDRAINS, OUTLET ENDINGS, & BULKHEADS	6-28-21
R-100-I	4	SEEDING AND TREE PLANTING	8-3-21
R-102-C	1	INSTALLATION OF WOVEN WIRE FENCE	3-22-21
R-110-B	3	PAVEMENT SAFETY EDGE	6-14-21
R-112-J	9	SHOULDER AND CENTER LINE CORRUGATIONS	5-13-21
R-126-I	5	PLACEMENT OF TEMPORARY CONCRETE & STEEL BARRIER	8-25-15

*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the May letting.**

Notes:

Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast-in-place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Bureau of Bridges & Structures, Structure Design Section, Special Structures Unit will provide special details for inclusion in construction plans for MDOT jobs. To assure prompt delivery, requests ***must*** **be made in advance.** Contact: MDOT-TriezenbergSquad@michigan.gov

Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2020 Standard Specifications for Construction.

Index to Bridge Detail Sheets

1-24-2022

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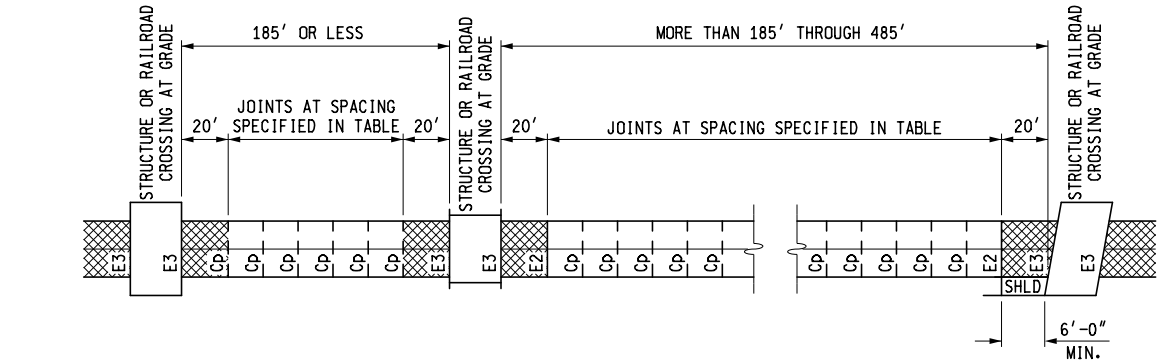
DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
B-22-E	5	BRIDGE RAILING, THRIE BEAM RETROFIT (R4 TYPE RAILING)	10-23-19
B-23-F	6	BRIDGE RAILING, THRIE BEAM RETROFIT (OPEN PARAPET RAILING)	10-23-19
B-28-A	7	BRIDGE BARRIER RAILING, TYPE 7	8-24-20
B-29-A	8	BRIDGE BARRIER RAILING, TYPE 6	8-24-20
B-50-A	3	BRIDGE RAILING, CONCRETE BLOCK RETROFIT	10-15-19
B-101-G	2	DRAIN CASTING ASSEMBLEY DETAILS	9-9-21
EJ3AD	1 to 3	EXPANSION JOINT DETAILS (See Notes)	4-26-21
EJ4Q	1 to 3	EXPANSION JOINT DETAILS (See Notes)	4-26-21
PC-1M	1	PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	8-23-17
PC-2H	1	70" PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	8-23-17
PC-4F	1	PRESTRESSED CONCRETE 1800 BEAM DETAILS (See Notes)	8-23-17

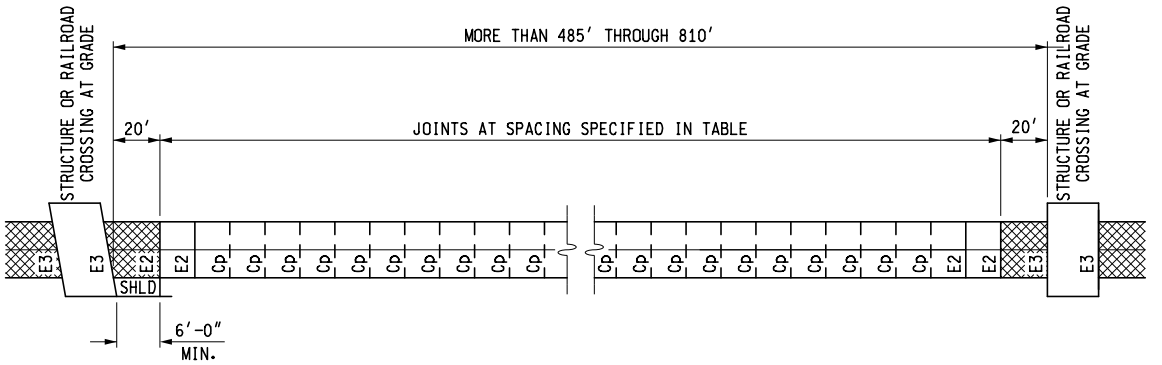
*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the May letting.**

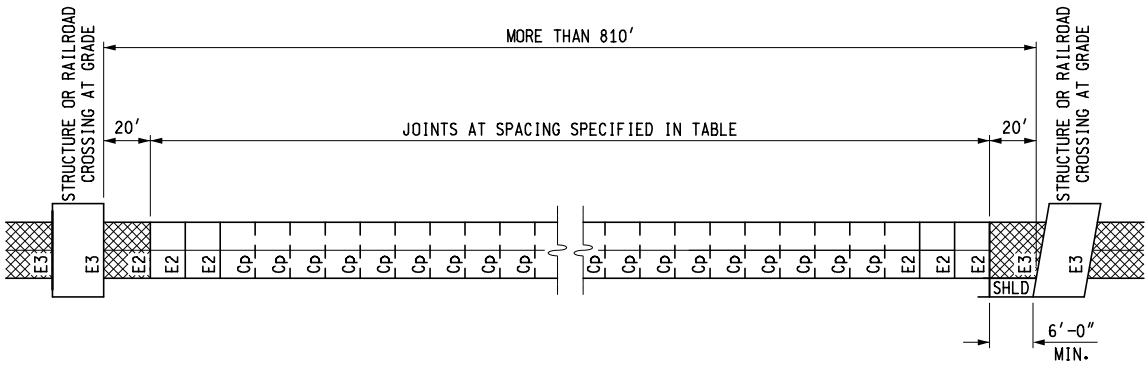
Notes:

Details EJ3AD & EJ4Q are interactive, i.e., designers and detailers choose details based upon railing type and angle of crossing and fill in the project specific dimensions for the end plate. Place all details appropriate for the project (including the end plate), structure specific information, and the Expansion Joint Device quantity on the sheet. Add the sheet to the plans as a normal plan sheet. Call out and designate the location of the expansion joint device and the end plate on the Superstructure Sheet in the plan set.

Details PC-1M, PC-2H, and PC-4F shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.







PLAN VIEW SHOWING TRANSVERSE JOINT LOCATIONS

NOTE:
SEE SHEET 2 FOR DETAIL OF JOINT SPACING WITH INTEGRAL / SEMI-INTEGRAL ABUTMENTS AND SLEEPER SLAB.

JOINT LEGEND
ACCORDING TO STANDARD PLAN R-39-SERIES

(E2) 1″ TRANSVERSE EXPANSION JOINT WITH LOAD TRANSFER ASSEMBLY
(E3) 1″ TRANSVERSE EXPANSION JOINT WITHOUT LOAD TRANSFER ASSEMBLY
(Cp) TRANSVERSE CONTRACTION JOINT
REINFORCED CONCRETE PAVEMENT ADJACENT TO BRIDGE REFERENCE LINE OR SLEEPER SLAB

JOINTED PLAIN CONCRETE PAVEMENT	
PAVEMENT THICKNESS	JOINT SPACING
$6\frac{1}{2}$″ TO $8\frac{3}{4}$″	12′
9″ TO $11\frac{3}{4}$″	14′
12″ OR MORE	16′

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Paul C. Ajegba

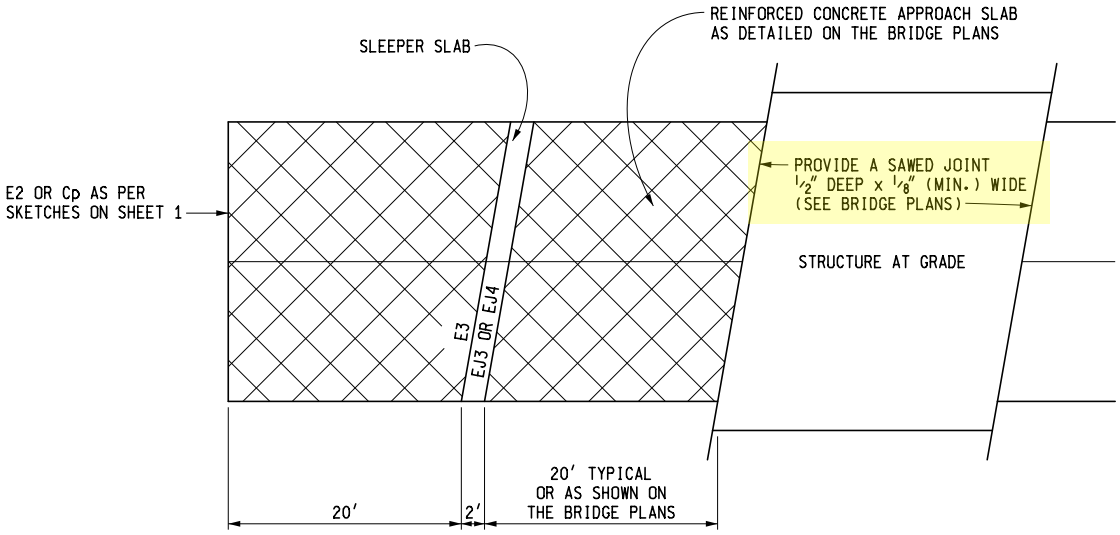
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT

F.H.W.A. APPROVAL	1-4-2022 PLAN DATE	R-43-J	SHEET 1 OF 2



JOINT SPACING WITH INTEGRAL / SEMI-INTEGRAL ABUTMENTS AND SLEEPER SLABS

NOTES:

UNLESS OTHERWISE SPECIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER, TRANSVERSE JOINTS SHALL BE PLACED AS SPECIFIED ON THIS STANDARD PLAN AND ON CURRENT STANDARD PLAN R-42-SERIES.

MAXIMUM JOINT SPACING SHALL NOT EXCEED THE DISTANCE SPECIFIED. WHEN A JOINT SPACING ADJUSTMENT IS REQUIRED, IT SHALL BE MADE BETWEEN CONTRACTION JOINTS WITH THE ADJUSTED SPACE BEING NOT LESS THAN 6'-6".

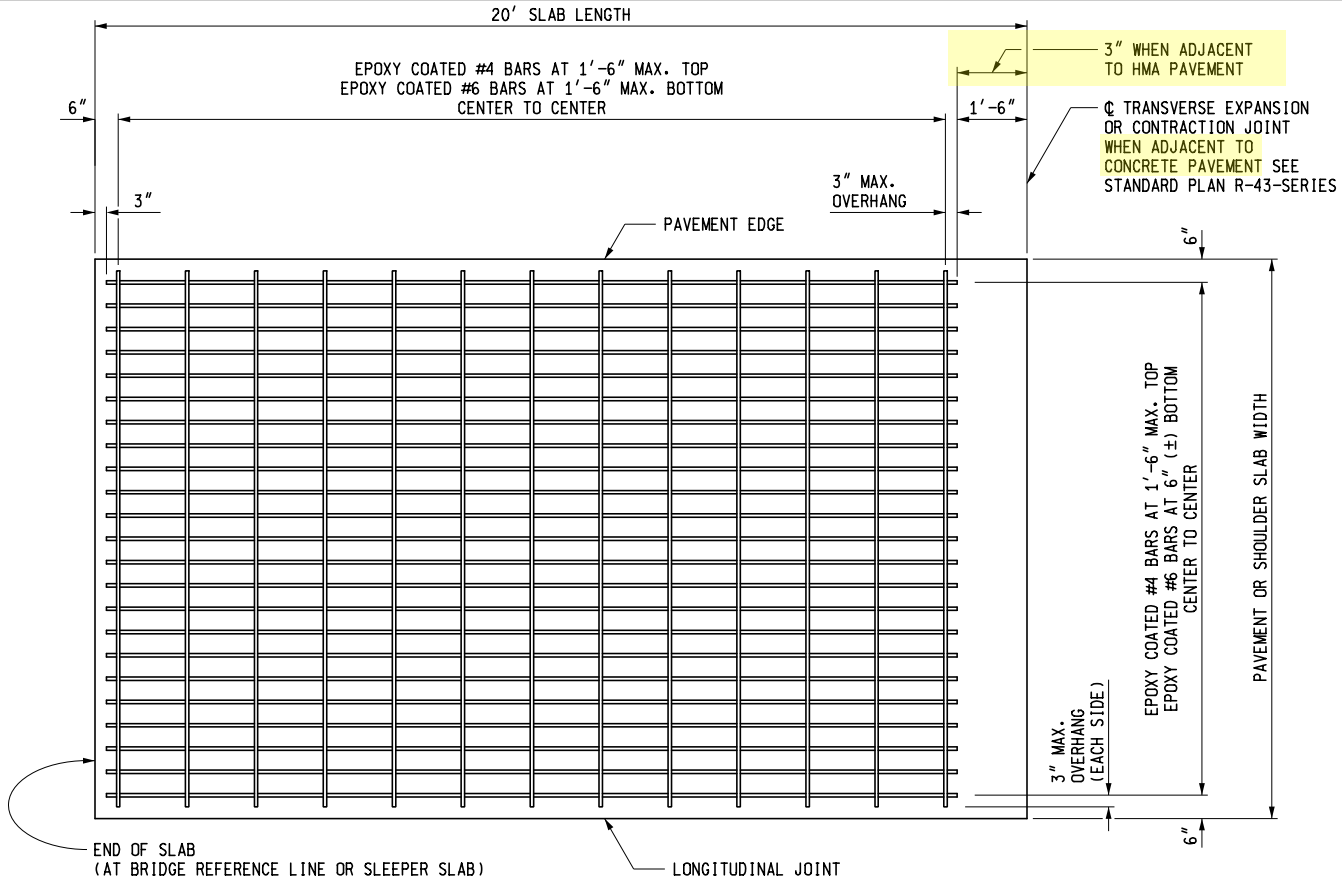
EXPANSION JOINTS SHALL ONLY BE PLACED AT STRUCTURES, INTERSECTIONS AND SPECIFIED LOCATIONS.

JOINTS ABUTTING RAILROAD TRACKS SHALL BE AS SPECIFIED ON CURRENT STANDARD PLAN R-121-SERIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT

F.H.W.A. APPROVAL	1-4-2022 PLAN DATE	R-43-J	SHEET 2 OF 2



SKEWED BRIDGES WHERE SLAB IS SQUARED OFF WILL REQUIRE TRANSVERSE REINFORCEMENT TO BE FANNED IN OR THE USE OF CUT BARS WILL BE REQUIRED. MAINTAIN REINFORCEMENT SPACING AT ACUTE CORNER AND FAN IN AT OBTUSE CORNER.

REINFORCEMENT DETAIL

STEEL REINFORCEMENT		
LONGITUDINAL REINFORCEMENT		
PAVEMENT/SHOULDER SLAB WIDTH	TOP REINFORCEMENT #4 BARS AT 1′-6″ MAX.	BOTTOM REINFORCEMENT #6 BARS AT 6″ (±)
	NUMBER OF BARS (MIN.)	NUMBER OF BARS (MIN.)
10′-0″	7	19
11′-0″	8	21
12′-0″	9	23
14′-0″	10	27
3′-0″	3	5
4′-0″	3	7
5′-0″	4	9
7′-0″	5	13
9′-0″	7	17
TRANSVERSE REINFORCEMENT		
	TOP REINFORCEMENT #4 BARS AT 1′-6″ MAX.	BOTTOM REINFORCEMENT #6 BARS AT 1′-6″ MAX.

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

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DEPARTMENT DIRECTOR
Paul C. Ajegba

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

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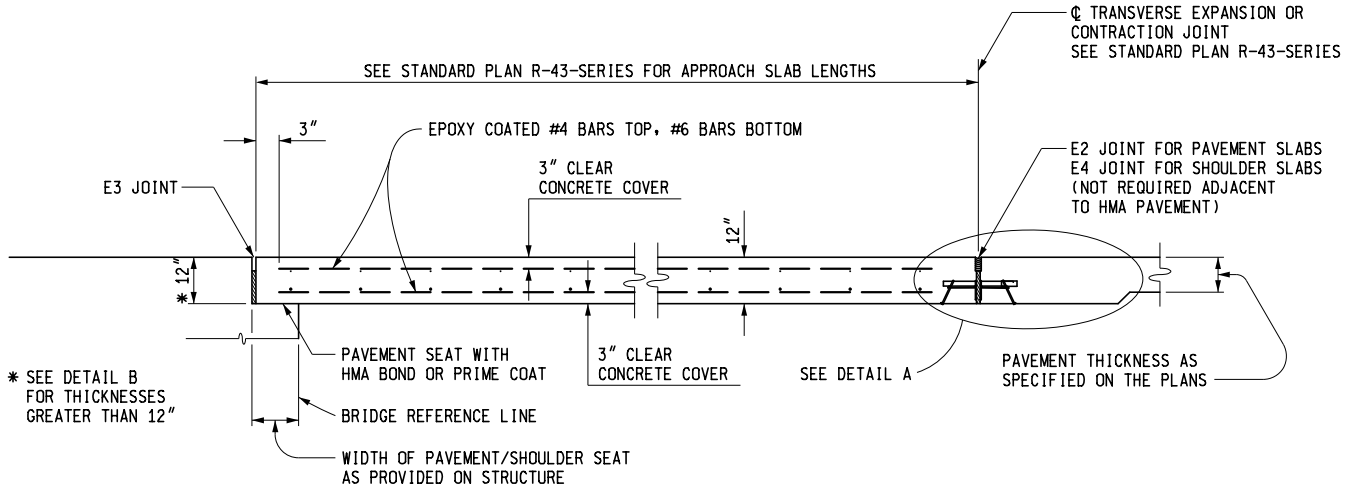
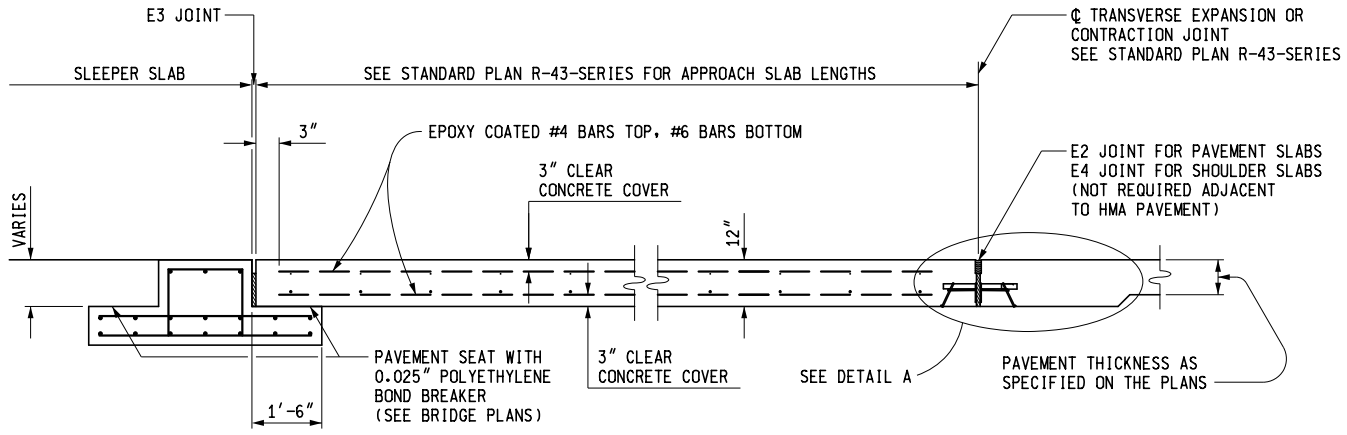
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

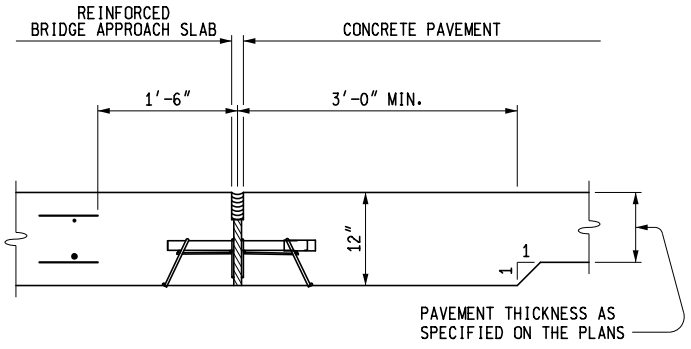
PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH

F.H.W.A. APPROVAL	1-4-2022 PLAN DATE	R-45-K	SHEET 1 OF 2



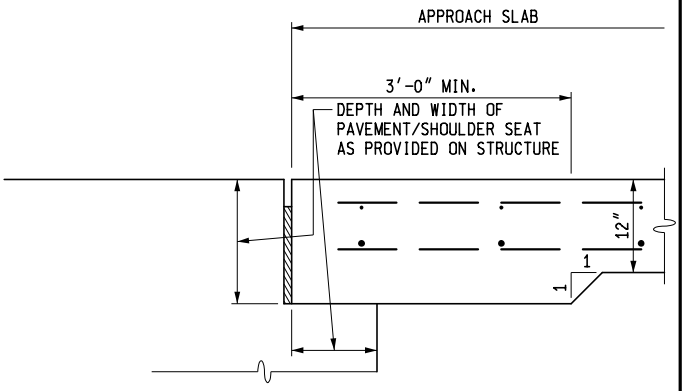


PAVEMENT AND SHOULDER SLABS ADJACENT TO STRUCTURES



DETAIL A

ADJACENT TO CONCRETE PAVEMENT



DETAIL B

USE WHEN DEPTH OF PAVEMENT/ SHOULDER SEAT IS GREATER THAN 12″

NOTES:

SEE STANDARD PLANS R-39-SERIES AND R-40-SERIES FOR DETAILS OF JOINTS AND LOAD TRANSFER ASSEMBLIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION

BUREAU OF DEVELOPMENT STANDARD PLAN FOR

PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH

F.H.W.A. APPROVAL	1-4-2022 PLAN DATE	R-45-K	SHEET 2 OF 2

6.03.11 (revised 1-24-2022)

HMA Construction Considerations

A. Bond Coat

Bond coat is commonly an asphalt emulsion used to enhance the adhesion of an HMA surface to an underlying paved surface. Several factors affect its need; e.g., an old, polished asphalt surface on a 50° F day would probably need it, whereas the second lift on a clean new leveling course, on a hot day, would probably not need it. Thin applications (approximately 0.05 gal/syd) are frequently referred to as "fog" or "tack" coats.

Bond coat is no longer a pay item, although the contractor must use it when it is determined necessary on construction. It must therefore be shown on the HMA Application Estimate, with a rate of application of up to 0.15 gal/syd indicated. Quantities should not be shown on the plans or in the log.

B. Prime Coat

Prime coat was formerly a medium-curing asphalt used at a rate of 0.25 gal/syd to seal off a gravel surface preparatory to paving with HMA and to aid in stabilizing the aggregate base so that trucks could run on it. Construction experienced delays waiting for it to cure, and with the dense-graded aggregate mixtures in use, it was often determined that prime coat was unnecessary. If prime coat is needed, Construction will add it by authorization. Designers are instructed to omit any reference to it

6.03.11 (continued)

C. Feathering and Tapering

(See Section 6.03.04B(3)) Feathering, as a method of discontinuing HMA surface at the ends of the project, or longitudinally at a curb face, is not as widely used as it was before the advent of the milling machine. There is still an occasional project, however, which requires that feathering be done. While more economical than constructing a butt-type joint, it is more prone to deterioration because of insufficient compaction at the thickness where the large-size aggregate tends to support the roller. This can be helped somewhat by using a finer mix for constructing approaches. Generally, the designer should provide for making butt joints along the trunkline, and for feathering at intersecting roads and streets, unless recommended otherwise at the Plan Review Meeting.

When feathering at a curb face, do not show the taper sharply breaking or a dimension for the width of the feathered area. The typical cross-section should illustrate the leveling course feathered out somewhat short of the curb and gutter, with the top course feathered at the curb. Quantities should be computed on the basis of full thickness to the curb face.

Sometimes it is necessary to transition a resurfacing to meet the existing top of pavement elevation, as when resurfacing a bridge deck or meeting railroad tracks. The proposed transition required to wash out the added thickness should be on the order of ¾" in 25'. This transition length should be shown on the plan or in the log.

6.03.11 (continued)

HMA Construction Considerations

J. Longitudinal Joint Density Quality Initiative

The quality of HMA pavements at longitudinal joints can be affected by the method and circumstance in which the joint is formed. Whether a cold joint is formed adjacent to existing surfaces or adjacent to new pavements from preceding stage construction, or a hot joint is formed with echelon paving, influences the ability to achieve sufficient density at the joint.

The specifications for Longitudinal Joint Density Quality Initiative is applied to all trunkline HMA projects (except non-motorized paths) and includes a pay item for incentives to the contractor for achieving acceptable ranges of density. The incentive payment is applicable to longitudinal joints between two new adjacent HMA pavements (Type 1). It does not apply to longitudinal joints adjacent to existing pavements or surfaces (Type 2), or where the contract documents specify the paving method (echelon paving, etc.).

The dollar amount of the incentive is prescribed by current specification or special provision and is dependent on the level of density achieved. The designer should base the estimated dollar amount on the maximum achievable incentive rate. This provides the Engineer the resources to encourage, reward, and maximize contractor effort and pavement quality.

6.03.11 (continued)

K. Temporary Pavement Marking

There are two basic types of wet reflective temporary pavement markings. Type R (removable) is an adhesive backed tape. Type NR (non-removable) may be either a tape or a painted stripe. Measurement is based on the length of marking actually required, not including the skips in the dashed lines. Temporary pavement marking quantities are determined as part of the maintaining traffic design.

For detailed information on temporary pavement markings, including type application, staging, payment, removal, and more, see Chapter 6 of the Work Zone Safety and Mobility Manual.

For specific details on temporary marking size and layout please refer to the pavement marking standard PAVE-904 Series Temporary Longitudinal Line Types & Placement for detailed information.

The pay items that can be used are listed below:

Pavt Mrkg, Wet Reflective, Type NR, Paint, __ inch, (color), Temp
Pavt Mrkg, Wet Reflective, Type NR, Tape, __ inch, (color), Temp
Pavt Mrkg, Wet Reflective, Type R, Tape, __ inch, (color), Temp

If a project has multiple stages and configurations, pavement markings for each stage need to be calculated. If the project is going to be over more than one construction season, additional quantities to refresh or replace the temporary markings should be accounted for.

6.05.03 (revised 11-28-2011)

General

It is the usual practice of the Department to construct hard-surfaced shoulders immediately adjacent to the traveled lanes of state trunklines. There are still many miles of gravel shoulders on the trunkline system, however, so this practice does not mandate that projects be let specifically to pave these shoulders. It is current practice, however, if a resurfacing project is proposed, to include at least a 3 ft. shoulder ribbon when the average daily traffic (ADT) is greater than or equal to 750. (See Section 3.09.02)

While existing prime and sealed shoulders are considered as "paved", the Department no longer builds prime and sealed shoulders, except as may be done by the Maintenance Division or by contract as part of heavy maintenance. This means that a 3 ft. HMA mat is normally the minimum type of paved shoulder that we would now construct. (Sometimes it is prudent to combine a pavement widening with the laying of a shoulder mat, painting the edge line on the shoulder paving in such a way as to provide 3 ft. of paved shoulder.)

Flush shoulders are required on ***new*** urban freeway construction. This requirement does not necessarily apply to urban freeway ***reconstruction.***

6.05.04 (revised 1-24-2022)

Shoulder Width

A. Freeways

Shoulder widths for freeways and ramps are specified in Appendix 3A.

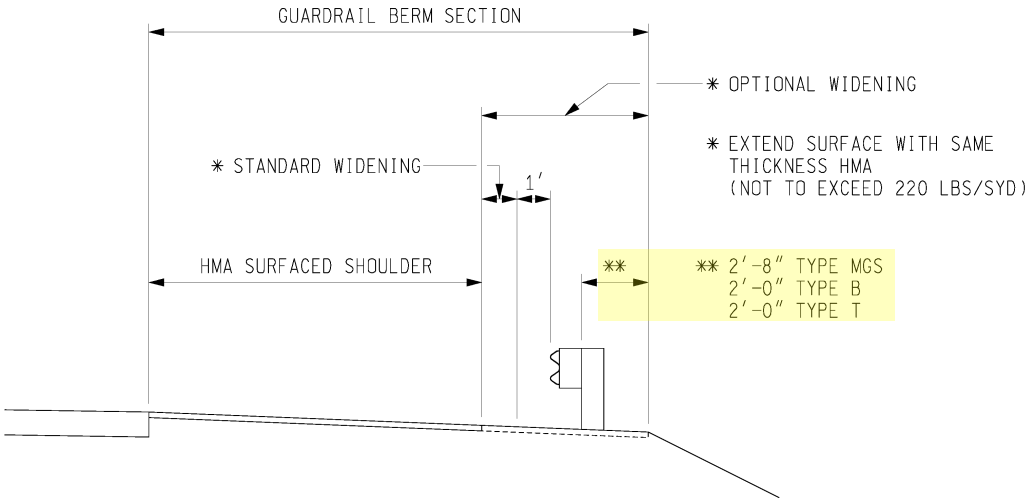
As a general practice, existing shoulder widths should not be reduced. This is of particular importance when upgrading guardrail as part of the project, as the most recent guardrail shoulder designs may have greater lateral width, than the old. Posts that are 8 ft. in length may be used to obtain proper shoulder width in guardrail sections (See Section 7.01.41D).

B. Paved Ramp Gores

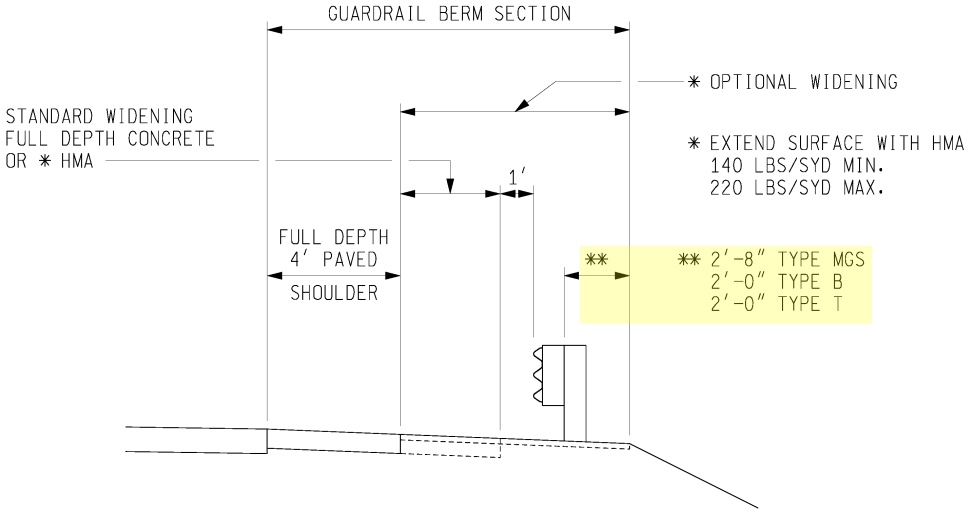
To reduce the need for maintenance in gore areas, additional shoulder paving should be provided to the point in the divergence where the 4 ft. ramp paved shoulder and the 10 ft. mainline paved shoulder are 8 ft. apart. This would typically be a total distance of 22 ft. (10 ft. + 8 ft. + 4 ft.) between the freeway mainline and ramp edges. This would still end the surfacing in front of the "Exit" sign. (This practice applies to new freeway construction and may apply to reconstruction and resurfacing, as determined.

6.05.04D (continued)

Shoulder Width



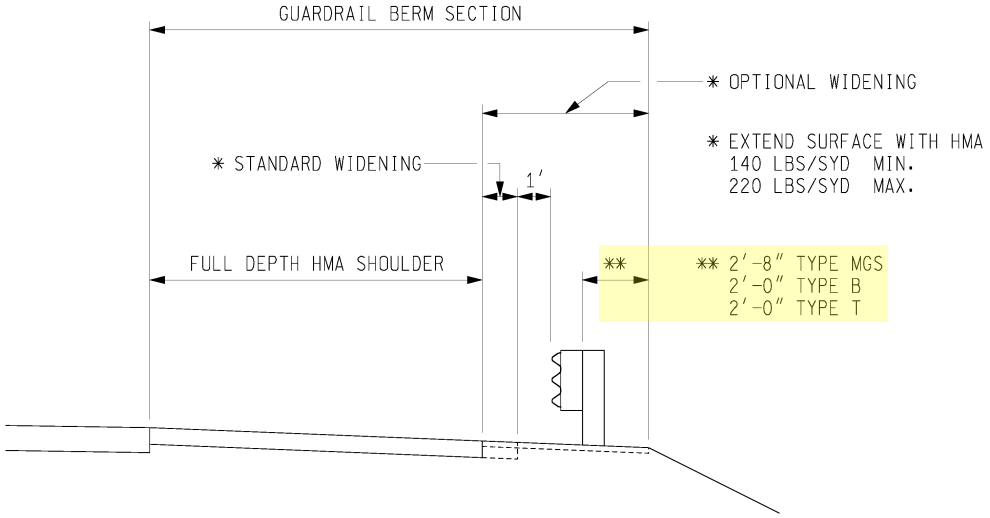
PAVED WIDENING FOR HMA SURFACED SHOULDERS
(220 LBS/SYD OR LESS)



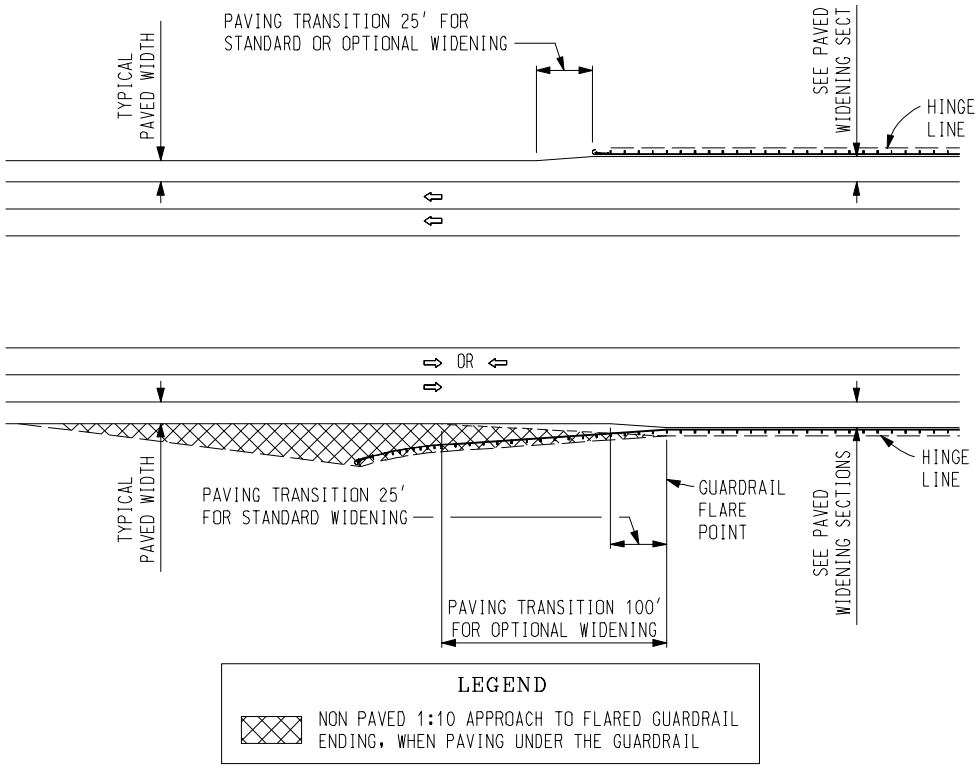
PAVED WIDENING FOR FULL DEPTH
CONCRETE OR HMA 4' PAVED MEDIAN SHOULDERS

6.05.04D (continued)

Shoulder Width



PAVED WIDENING FOR FULL DEPTH HMA SHOULDERS



TRANSITIONS FOR ENDING WIDENED SHOULDER PAVING

6.06.15

Minimum Curb and Gutter Grades

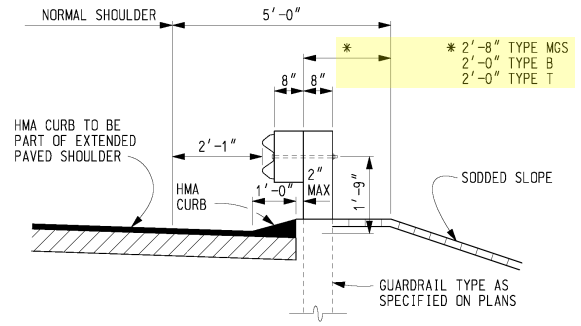
In lowland urban areas it is frequently difficult to obtain a minimum 0.25% centerline grade and an accompanying minimum gutter grade of 0.30%. In these cases, it is necessary to "roll" the gutter grades to achieve 0.30%. Because of construction tolerances, any grade less than 0.30% makes proper drainage difficult. In critical areas where it is required that this grade be reduced, drainage structure spacing should be reduced accordingly, but under no circumstances should the gutter grade be less than 0.20%.

6.06.16 (revised 1-24-2022)

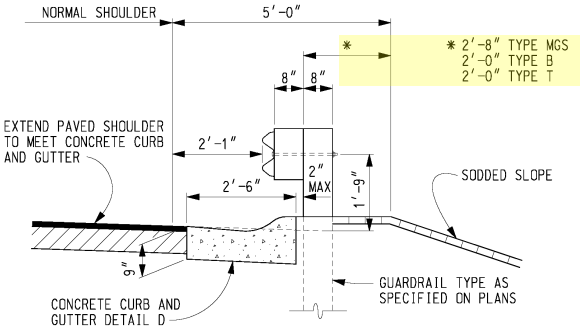
Curb and Gutter for Erosion Control

Long fill sections, usually those requiring guardrail because of their height, are occasionally subject to slope erosion due to concentrations of roadway runoff. This runoff can be controlled by extending the shoulder surfacing and using either a roll curb and gutter, Detail D, or an HMA curb on the outside edge of the shoulder. The placement of the back edge of the curb shall be 2" maximum in front of the guardrail post. Concrete downspout headers then conduct the water away. The need for erosion control curb is usually determined at the Plan Review Meeting. The following sketches illustrate this concept.

6.06.16 (continued)



(HMA CURB)



(CONCRETE CURB & GUTTER)

SKETCHES SHOWING EROSION CONTROL TREATMENT AT GUARDRAIL EMBANKMENTS RURAL HIGHWAYS

Designers must use some judgment in calling for this type of treatment. It may be necessary to place erosion control curb and gutter on the inside of superelevated curves through guardrail embankments, and on both sides in long tangent sections. FHWA has, in the past, been reluctant to approve widespread use of erosion control curb and gutter; therefore, even if it has been recommended at the Plan Review Meeting, the designer should verify that FHWA has concurred with its use before the Final Project Coordination (FPC) meeting. See Section 6.03.18B.

7.03.01 (continued)

Abutment Design

B. Types

4. Integral and Semi - Integral Abutments

Integral and semi-integral abutments shall be used where practical to avoid deck joints. (5-1-2000)

Integral Abutment

Abutment walls (stub type) supported by one row of piles that allow movement through pile flexure (see Bridge Design Guide 6.20.04 series). Walls shall be a minimum of 5'-0" and 12'-0" maximum in height. The H-Pile webs shall be oriented parallel to the bridge reference lines and embedded 30" into the abutment wall. Upon recommendation from Geotechnical Services Section pile holes shall be prebored. In general, integral abutments do not have return wingwalls.

A separate design analysis needs to be performed on the abutment wall for active and passive pressures. Additional vertical dowels may be required at the abutment and backwall interface to resist the active surcharge and the passive resistance that have been introduced into the wall from bridge expansion. Additional vertical reinforcement may be required in the abutment wall and should also be designed. The pile spacing may need to be adjusted to prevent shear stress failure in the pile.

Due to scour considerations, the designer should usually avoid using Integral abutments at stream crossings. (5-1-2000)

Semi-Integral Abutment

Conventional abutment walls fixed in position with expansion and contraction movement of the bridge superstructure (see Bridge Design Guide 6.20.04 series). Abutments with a single row of piles should not be used.

7.03.01 (continued)

The following design criteria are valid for both types of abutments.

a. Steel bridges are to be less than 300'-0" and concrete bridges are to be less than 400'-0" in length.

b. Use approach slab details on Standard Plan R-45-Series when the length of bridge contributing to expansion at an abutment is less than 50'-0" for concrete beam bridges and less than 25'-0" for steel beam bridges. (11-28-2011)

c. Angle of crossing shall be 60 degrees minimum and 120 degrees maximum. See Section 7.01.14 for MDOT skew policy. (12-5-2005)

d. Backfill shall be “Backfill, Structure, CIP” as per Standard Specifications.

Place aggregate base or open graded drainage course (OGDC) over structure backfill to support approach slabs, sleeper slabs and approach curb and gutter. (10-22-2012) (12-28-2015)

e. Pavement seats are 9” wide for dependent backwalls, and approach slabs project to the bridge slab over independent backwalls. Avoid cantilevered pavement seats. (1-24-2022)

7.03.01 (continued)

Abutment Design

B. Types

4. Integral and Semi-Integral Abutments

f. (1-24-2022) Approach slabs are 20'-0" in length whenever possible.

Approach slabs 20'-0" in length are based on a longitudinal unsupported length of 10 feet measured along the centerline of the roadway, a slab thickness of 12" and a maximum concrete cover to the centerline of the bottom longitudinal reinforcement of 3". Deviation from these design parameters for specific projects requires a complete redesign of the approach slab.

Approach slabs with independent backwalls can be 6'-6" minimum length. For design speeds greater than 45 mph (posted > 40 mph) approach slabs may be up to 20' in length (measured along roadway centerline) as project and geometric limitations allow. Use shorter approach slab length (6'-6" min) if service road is in close proximity to the bridge abutment. (12-28-2015)

Abutments with a skew angle maintain the same skew angle at the end of the bridge approach slab and at the sleeper slab. Standard Plan R-45-Series reinforced approach pavements are cast perpendicular (90°) to the roadway centerline on the opposite end of the sleeper slab. See Standard Plan R-43-Series. (12-28-2015)

Cast 12" minimum thickness (9" for independent backwalls) bridge approach slab from sleeper slab towards reference lines at night with "Superstructure Conc, Night Casting (,High Performance)". (9-27-2021)

Use a 20' concrete approach pavement as detailed on Standard Plan R-43 & R-45-Series located on the road approach side of the sleeper slab.(10-22-2012)

7.03.01 B. 4. f. (continued)

Designate approach slabs as separate pours in the pour sequence of the superstructure. (9-21-2015)

See Bridge Design Guide 6.20.03A, .03B, 6.20.04 & .04B for approach slab details. (12-28-2015)

g. Continue bottom mat of deck reinforcement 2'-0" past reference line into the approach slab with independent backwalls. See Bridge Design Guides 6.20.03A & .03B. For dependent backwalls lap or develop EA bars from deck slab to bridge approach slab. See Bridge Design Guides 6.20.04 & .04B. (1-24-2022)

h. Add extra reinforcement over beams at the reference line that extend 2'-0" into the approach slab and 2'-0" into the bridge deck slab with independent backwalls. For dependent backwalls lap or develop extra EA bars over beams. (1-24-2022)

i. Attach approach curb and gutter to the approach slab with bottom mat transverse reinforcement and to the bridge deck with bottom mat longitudinal reinforcement. Do not attach curb and gutter to the approach slab or the bridge deck on structures with return wingwalls. Using a bond breaker and sliding the approach slab over the return wingwalls is a design consideration. The extension of bridge railing to the sleeper slab will eliminate the need for curb and gutter in the bridge approach slab area. (1-24-2022)

j. An inverted "T" sleeper slab shall be used with all approach slabs (except when Standard Plan R-45-Series approach is used by itself). Concrete to concrete slabs shall have an EJ3 (or EJ4) joint on the bridge side of the stub and an E3 joint on the road side. Place R-45-Series reinforced concrete slab on the road side of the inverted "T" sleeper slab. Provide elevations along stub of sleeper slab at construction centerline, lane lines and edge of metal. Provide elevations at toe of curb/barrier and top of curb if present. (1-24-2022)

7.03.01 (continued)

Abutment Design

B. Types

4. Integral and Semi - Integral Abutments

Integral and semi-integral abutments shall be used where practical to avoid deck joints. (5-1-2000)

Integral Abutment

Abutment walls (stub type) supported by one row of piles that allow movement through pile flexure (see Bridge Design Guide 6.20.04 series). Walls shall be a minimum of 5'-0" and 12'-0" maximum in height. The H-Pile webs shall be oriented parallel to the bridge reference lines and embedded 30" into the abutment wall. Upon recommendation from Geotechnical Services Section pile holes shall be prebored. In general, integral abutments do not have return wingwalls.

A separate design analysis needs to be performed on the abutment wall for active and passive pressures. Additional vertical dowels may be required at the abutment and backwall interface to resist the active surcharge and the passive resistance that have been introduced into the wall from bridge expansion. Additional vertical reinforcement may be required in the abutment wall and should also be designed. The pile spacing may need to be adjusted to prevent shear stress failure in the pile.

Due to scour considerations, the designer should usually avoid using Integral abutments at stream crossings. (5-1-2000)

Semi-Integral Abutment

Conventional abutment walls fixed in position with expansion and contraction movement of the bridge superstructure (see Bridge Design Guide 6.20.04 series). Abutments with a single row of piles should not be used.

7.03.01 (continued)

The following design criteria are valid for both types of abutments.

a. Steel bridges are to be less than 300'-0" and concrete bridges are to be less than 400'-0" in length.

b. Use approach slab details on Standard Plan R-45-Series when the length of bridge contributing to expansion at an abutment is less than 50'-0" for concrete beam bridges and less than 25'-0" for steel beam bridges. (8-20-2009)

c. Angle of crossing shall be 60 degrees minimum and 120 degrees maximum. See Section 7.01.14 for MDOT skew policy. (12-5-2005)

d. Backfill shall be “Backfill, Structure, CIP” as per Standard Specifications.

Place aggregate base or open graded drainage course (OGDC) over structure backfill to support approach slabs, sleeper slabs and approach curb and gutter. (10-22-2012) (12-28-2015)

e. Pavement seats are 9” wide for dependent backwalls, and approach slabs project to the bridge slab over independent backwalls. Avoid cantilevered pavement seats. (1-24-2022)

7.03.01 (continued)

Abutment Design

B. Types

4. Integral and Semi-Integral Abutments

f. (1-24-2022) Approach slabs are 20'-0" in length whenever possible.

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Approach slabs with independent backwalls can be 6'-6" minimum length. For design speeds greater than 45 mph (posted > 40 mph) approach slabs may be up to 20' in length (measured along roadway centerline) as project and geometric limitations allow. Use shorter approach slab length (6'-6" min) if service road is in close proximity to the bridge abutment. (12-28-2015)

Abutments with a skew angle maintain the same skew angle at the end of the bridge approach slab and at the sleeper slab. Standard Plan R-45-Series reinforced approach pavements are cast perpendicular (90°) to the roadway centerline on the opposite end of the sleeper slab. See Standard Plan R-43-Series. (12-28-2015)

Cast 12" minimum thickness (9" for independent backwalls) bridge approach slab from sleeper slab towards reference lines at night with "Superstructure Conc, Night Casting (,High Performance)". (9-27-2021)

Use a 20' concrete approach pavement as detailed on Standard Plan R-43 & R-45-Series located on the road approach side of the sleeper slab.(10-22-2012)

7.03.01 B. 4. f. (continued)

Designate approach slabs as separate pours in the pour sequence of the superstructure. (9-21-2015)

See Bridge Design Guide 6.20.03A, .03B, 6.20.04 & .04B for approach slab details. (12-28-2015)

g. Continue bottom mat of deck reinforcement 2'-0" past reference line into the approach slab with independent backwalls. See Bridge Design Guides 6.20.03A & .03B. For dependent backwalls lap or develop EA bars from deck slab to bridge approach slab. See Bridge Design Guides 6.20.04 & .04B. (1-24-2022)

h. Add extra reinforcement over beams at the reference line that extend 2'-0" into the approach slab and 2'-0" into the bridge deck slab with independent backwalls. For dependent backwalls lap or develop extra EA bars over beams. (1-24-2022)

i. Attach approach curb and gutter to the approach slab with bottom mat transverse reinforcement and to the bridge deck with bottom mat longitudinal reinforcement. Do not attach curb and gutter to the approach slab or the bridge deck on structures with return wingwalls. Using a bond breaker and sliding the approach slab over the return wingwalls is a design consideration. The extension of bridge railing to the sleeper slab will eliminate the need for curb and gutter in the bridge approach slab area. (1-24-2022)

j. An inverted "T" sleeper slab shall be used with all approach slabs (except when Standard Plan R-45-Series approach is used by itself) . Concrete to concrete slabs shall have an EJ3 (or EJ4) joint on the bridge side of the stub and an E3 joint on the road side. Place R-45-Series reinforced concrete slab on the road side of the inverted "T" sleeper slab. Provide elevations along stub of sleeper slab at construction centerline, lane lines and edge of metal. Provide elevations at toe of curb/barrier and top of curb if present. (1-24-2022)

7.07

APPROACH ITEMS

7.07.01

Guardrail

All new guardrail anchorages to bridges will utilize thrie beam guardrail according to Standard Plan R-67-Series and will be anchored directly to the bridge railing or pier filler walls. (5-6-99)

Where there are independent backwalls, that is, where there will be thermal deck movement at the abutments, the movement will be accommodated by the slots in the expansion section of the guardrail anchorage.

For additional information see Road Design Manual Section 7.01.16.

7.07.02

Curb and Gutter for Rural Bridges

The types and lengths of bridge approach curb and gutters (including valley gutter, where required) shall be determined by the bridge designer and shown on the General Plan of Structure Sheet.

A. Bridge approach curb and gutter will be according to Standard Plan R-32-Series **with a 4" maximum curb height**. It should be emphasized that this criteria is only a guide and that the designer should use engineering judgement in determining the type of structure to use.

    1. Bridge Approach Curb and Gutter, Detail 5 will be used on the high end of a bridge where the bridge drains away from the curb and gutter or on departing end of bridges when guardrail is not needed.

    2. Bridge Approach Curb and Gutter, Detail 6 and 6A will be used on the low ends of a bridge where the paved area draining to the curb and gutter is less than 2,500 SFT and the fill height is less than 10'-0". Where the drainage area exceeds 2,500 SFT, use Detail 7. (5-6-99)

7.07.02 (continued)

    3. Bridge Approach Curb and Gutter, Detail 7 and 7A will be used on the low ends of a bridge where the fill height is over 10'-0". One downspout header shall be provided for each 3500 SFT of paved drainage area or fraction thereof. If it is not readily apparent whether to use Detail 6 or Detail 7, use Detail 7. (5-6-99)

    If the bridge railing is other than the standard shape, the approach curb and gutter should be modified or transitioned to fit the bridge curb.

C. Payment for all types of bridge approach curb and gutter will be included in the pay item "Curb and Gutter, Bridge Approach". The quantities shall be included in the Road Plans when bridge and road work is "packaged" together. (5-6-99)

For additional information see Road Design Manual Section 6.06.08 and MDOT Drainage Manual. (11-25-2019)

7.07.03 (5-6-99)

Bridge Approach Pavement

To eliminate approach pavement settlement, a concrete approach section will be used for all new bridges and bridge replacements, deck and superstructure replacement projects and concrete overlays. For hot mix asphalt (HMA) deck overlays, a concrete approach section is not necessary. The details of the approach slab shall be as specified on Standard Plan R-45-Series except on existing structures, where the grade will not be raised; the length of the approach slab shall match the existing slab joint. (9-2-2003)

Use approach pavements for integral and semi-integral abutment designs according to Bridge Design Guide 6.20.04 Series.

Use approach pavements for sliding slab over backwall designs according to Bridge Design Guides 6.20.03 Series. (1-24-2022)

7.07

APPROACH ITEMS

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Guardrail

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Where there are independent backwalls, that is, where there will be thermal deck movement at the abutments, the movement will be accommodated by the slots in the expansion section of the guardrail anchorage.

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7.07.02 (continued)

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Use approach pavements for integral and semi-integral abutment designs according to Bridge Design Guide 6.20.04 Series.

Use approach pavements for sliding slab over backwall designs according to Bridge Design Guides 6.20.03 Series. (1-24-2022)

12.07.03

Pins and Hangers (1-24-2022)

The pin and hanger assemblies of cantilever bridges are particularly susceptible to corrosion, and their replacement may have to be included in painting contracts. Region scoping engineers will designate which assemblies will have to be replaced. See Chapter 7 for details.

Where steel beams of adjacent spans are in contact or insufficient expansion length is available between beam ends, consider addressing the closure and the cause of the closure.

If the webs are buckling at closed pin and hanger assemblies, the closure should be addressed.

There are several options to address the closure. Feasibility of various options is dependent on the proposed scope of work. The decision should also be based on the maintenance report and/or observations made during field reviews.

Often, pressure from approaching concrete pavements cause the superstructure to shorten and should be addressed by adding pavement relief joints.

12.07.03 (continued)

The following repair methodology/criteria is relevant only for redundant structures:

If two pin and hanger assemblies exist between fixed bearings, the closed pin and hanger assembly can be fixed by adding a bolted stay plate and removing the stay plate at the opposing assembly. Substructures should be analyzed for additional loads, where applicable.

If the deck is being replaced, beams may be pulled back to their original location, restoring the opening between beam ends. Other work to the superstructure may be necessary.

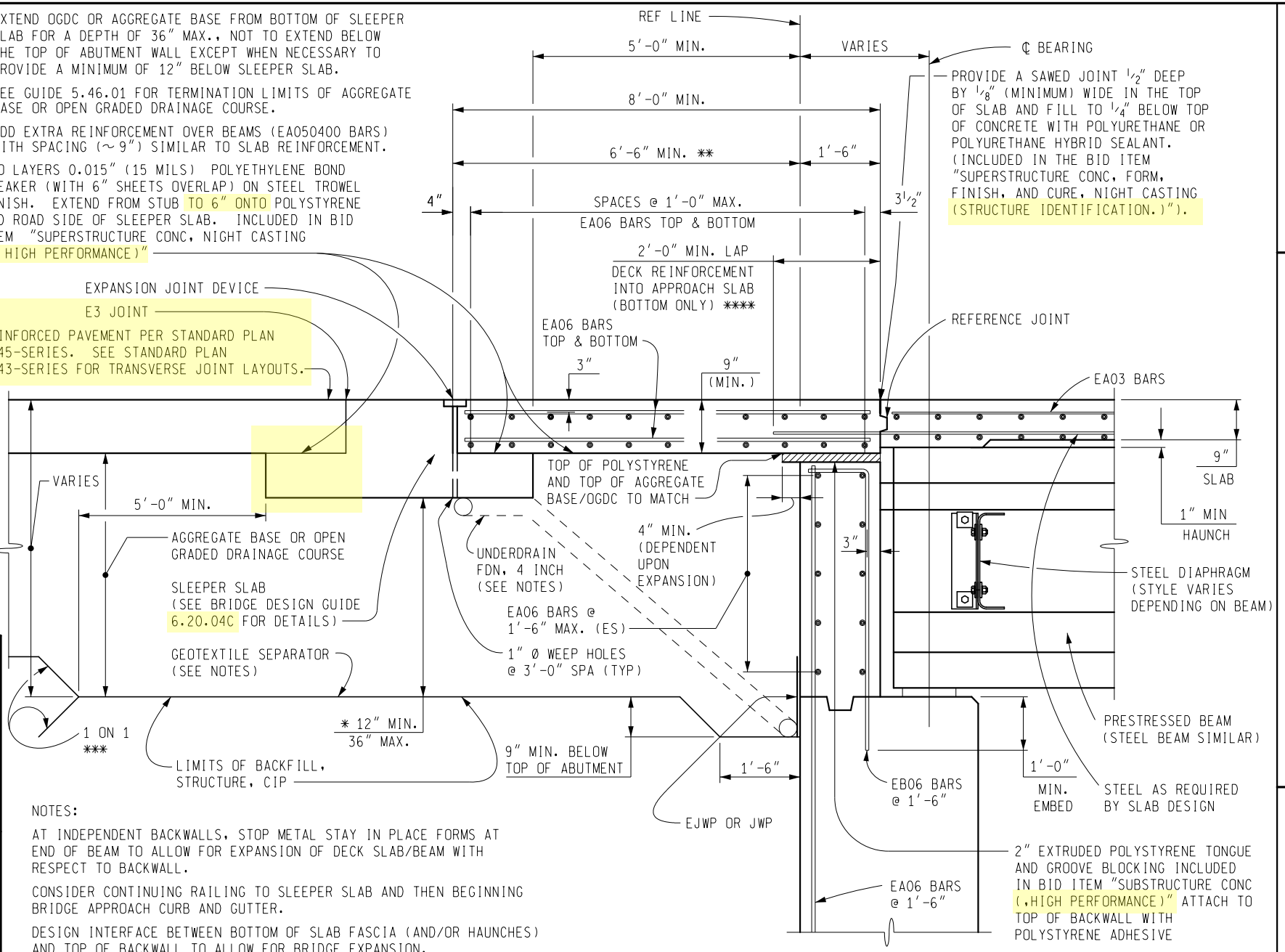
If necessary, beam ends can be trimmed. To determine the feasibility of trimming, the capacity of the beam must be evaluated for the proposed edge distance between the pin holes and the cut surfaces. If pack rust exists between pin plates of built-up members, employ mechanical means of beam cutting.

If beams are in contact, and cutting or other methods stated above cannot be implemented to relieve the pressure and/or restore the opening between beam ends, an analysis should be performed to ensure that the beams can be left in contact until a project with sufficient scope to address the issue can be constructed.

The assessment and repair of non-redundant (fracture critical) structures should be handled on a case by case basis. It may not be prudent to leave girder ends in contact until a project with sufficient scope can be constructed since web buckling of a single member could have a larger impact on the overall performance of the superstructure.

New pins shall be stainless steel and used in conjunction with nylon washers and non-metallic bushings. New pin plates/link plates shall use an allowable bearing stress of 0.8 F_y. Non-redundant structures shall use a reduced allowable bearing stress of 0.4 F_y. (12-5-2005)

CONTENTS



* EXTEND OGDC OR AGGREGATE BASE FROM BOTTOM OF SLEEPER SLAB FOR A DEPTH OF 36" MAX., NOT TO EXTEND BELOW THE TOP OF ABUTMENT WALL EXCEPT WHEN NECESSARY TO PROVIDE A MINIMUM OF 12" BELOW SLEEPER SLAB.

*** SEE GUIDE 5.46.01 FOR TERMINATION LIMITS OF AGGREGATE BASE OR OPEN GRADED DRAINAGE COURSE.

**** ADD EXTRA REINFORCEMENT OVER BEAMS (EA050400 BARS) WITH SPACING (~ 9") SIMILAR TO SLAB REINFORCEMENT.

TWO LAYERS 0.015" (15 MILS) POLYETHYLENE BOND BREAKER (WITH 6" SHEETS OVERLAP) ON STEEL TROWEL FINISH. EXTEND FROM STUB TO 6" ONTO POLYSTYRENE AND ROAD SIDE OF SLEEPER SLAB. INCLUDED IN BID ITEM "SUPERSTRUCTURE CONC, NIGHT CASTING (, HIGH PERFORMANCE)"

PROVIDE A SAWED JOINT ½" DEEP BY ⅛" (MINIMUM) WIDE IN THE TOP OF SLAB AND FILL TO ¼" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT. (INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, FORM, FINISH, AND CURE, NIGHT CASTING (STRUCTURE IDENTIFICATION.)").

NOTES:

AT INDEPENDENT BACKWALLS, STOP METAL STAY IN PLACE FORMS AT END OF BEAM TO ALLOW FOR EXPANSION OF DECK SLAB/BEAM WITH RESPECT TO BACKWALL.

CONSIDER CONTINUING RAILING TO SLEEPER SLAB AND THEN BEGINNING BRIDGE APPROACH CURB AND GUTTER.

DESIGN INTERFACE BETWEEN BOTTOM OF SLAB FASCIA (AND/OR HAUNCHES) AND TOP OF BACKWALL TO ALLOW FOR BRIDGE EXPANSION.

OMIT UNDERDRAIN UNDER SLEEPER SLAB IF OPEN GRADED DRAINAGE COURSE IS USED INSTEAD OF AGGREGATE BASE. MAINTAIN UNDERDRAIN AT ABUTMENT.

USE GEOTEXTILE SEPARATOR ONLY WITH OPEN GRADED DRAINAGE COURSE.

** SEE BRIDGE DESIGN GUIDE 6.20.03B FOR APPROACH SLAB ORIENTATION, REINFORCEMENT, AND DESIRED SLAB LENGTHS.

PLAN NOTE:
DO NOT USE WHEELED, ROLLER BASED OR MACHINE MOUNTED COMPACTION EQUIPMENT TO COMPACT THE SUBGRADE, SUBBASE, AND BASE WITHIN 10' OF THE SLEEPER SLAB AFTER IT IS BUILT. USE ONLY HAND/PLATE COMPACTORS. CONTACT PRESSURE OF COMPACTION EQUIPMENT SHALL NOT EXCEED 10 PSI.

DRAWN BY: BLT
CHECKED BY: VZ
APPROVED BY: BMW

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT

TYPICAL SECTION THRU INDEPENDENT BACKWALL WITH SLIDING SLAB

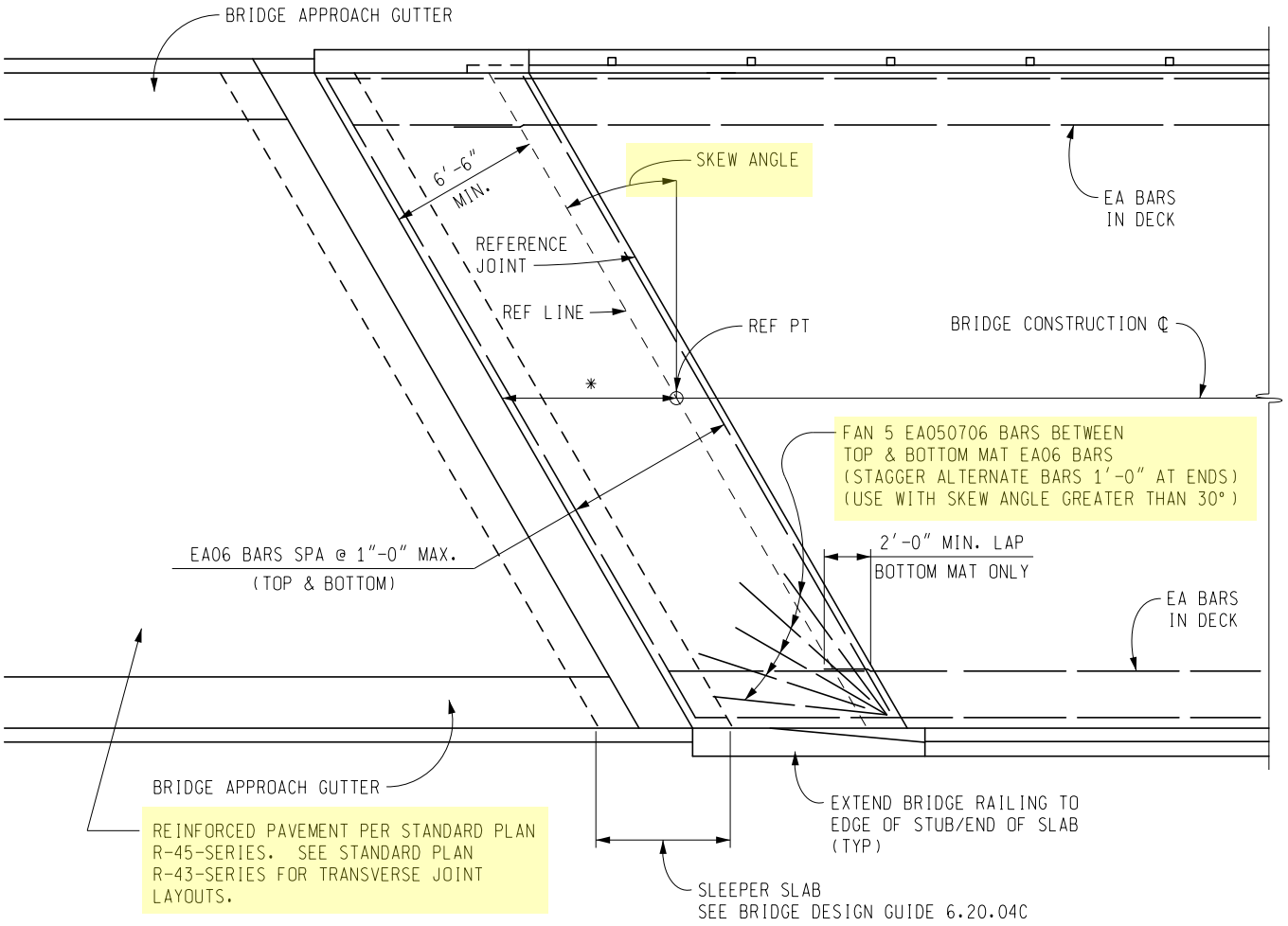
ISSUED: 01/24/22
SUPERSEDES: 10/25/21

PREPARED BY
DESIGN DIVISION

6.20.03A

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT INDEPENDENT BACKWALL SLIDING SLAB DETAILS	ISSUED: 01/24/22 SUPERSEDES: 08/24/20

* FOR DESIGN SPEEDS GREATER THAN 45 MPH (POSTED > 40 MPH), THE DESIGNER MAY CONSIDER LENGTHS UP TO 20 FEET IN LENGTH (MEASURED ALONG ℄) AS PROJECT AND GEOMETRIC LIMITATIONS ALLOW.



PLAN OF APPROACH

NOTES:

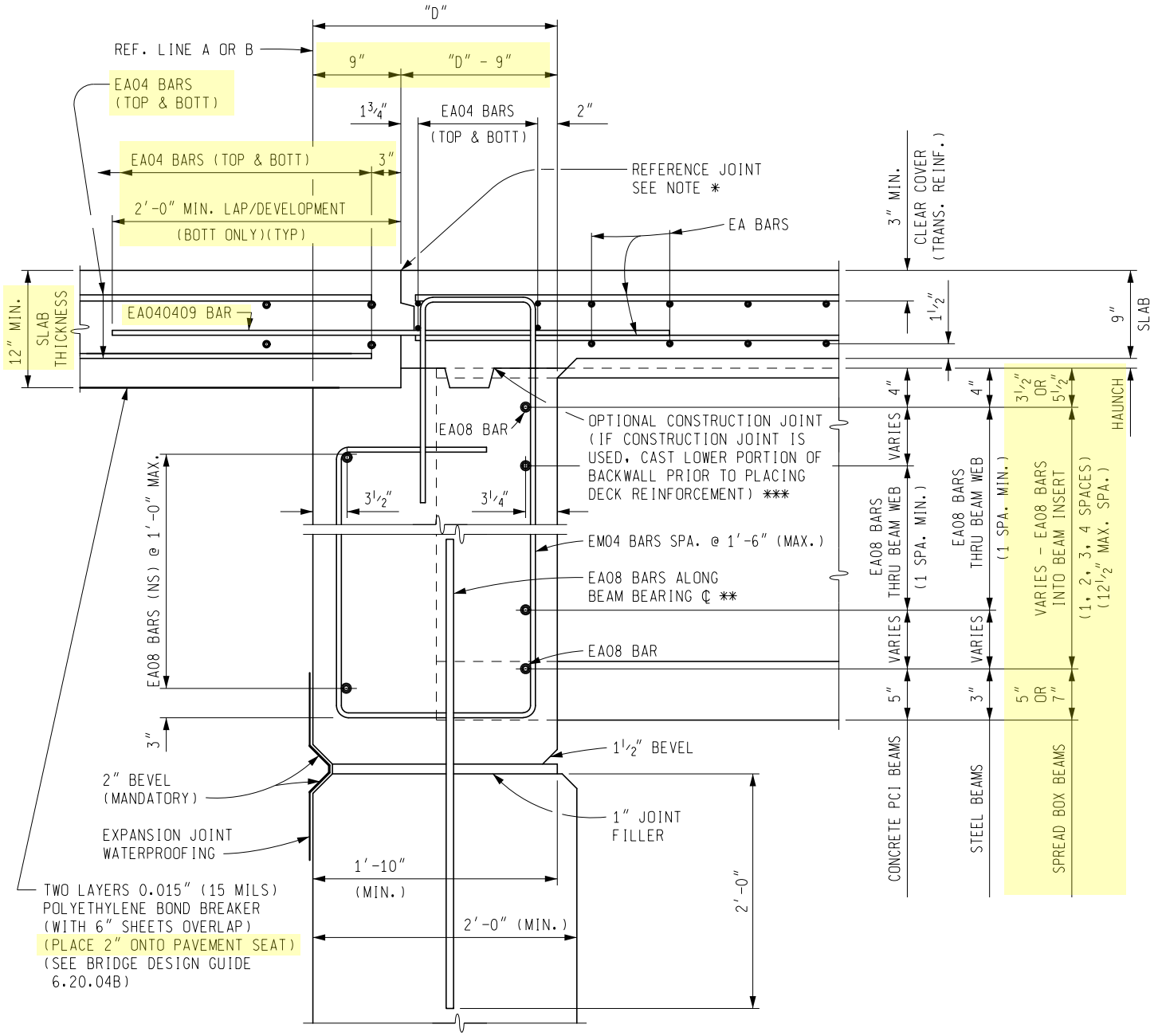
POUR APPROACH SLABS FROM EXPANSION LOCATION TOWARD REFERENCE LINE (JOINT).

CAST APPROACH SLABS AT NIGHT WITH NIGHT TIME CASTING OF SUPERSTRUCTURE CONCRETE.

PLAN NOTE:
DO NOT USE WHEELED, ROLLER BASED OR MACHINE MOUNTED COMPACTION EQUIPMENT TO COMPACT THE SUBGRADE, SUBBASE, AND BASE WITHIN 10' OF THE SLEEPER SLAB AFTER IT IS BUILT. USE ONLY HAND/PLATE COMPACTORS. CONTACT PRESSURE OF COMPACTION EQUIPMENT SHALL NOT EXCEED 10 PSI.

PREPARED BY DESIGN DIVISION	6.20.03B

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT INTEGRAL AND SEMI-INTEGRAL ABUTMENT BACKWALL	ISSUED: 01/24/22 SUPERSEDES: 08/24/20



PLAN NOTES:

*** WHERE OPTIONAL CONSTRUCTION JOINTS ARE USED, THERE WILL BE NO PAYMENT FOR THE REQUIRED JOINT WATERPROOFING.

* PROVIDE A SAWED JOINT ½" DEEP BY ⅛" (MINIMUM) WIDE IN THE TOP OF SLAB AND FILL TO ¼" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT. (INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, FORM, FINISH, AND CURE, NIGHT CASTING (STRUCTURE IDENTIFICATION.)").

NOTES:

USE INTEGRAL OR SEMI-INTERGRAL ABUTMENTS FOR STEEL BRIDGES LESS THAN 300' AND CONCRETE BRIDGES LESS THAN 400' IN LENGTH.

LAP/DEVELOP BOTTOM MAT OF REINFORCEMENT THROUGH REFERENCE JOINT. ADD EXTRA REINFORCEMENT OVER BEAMS (EA040409 BARS).

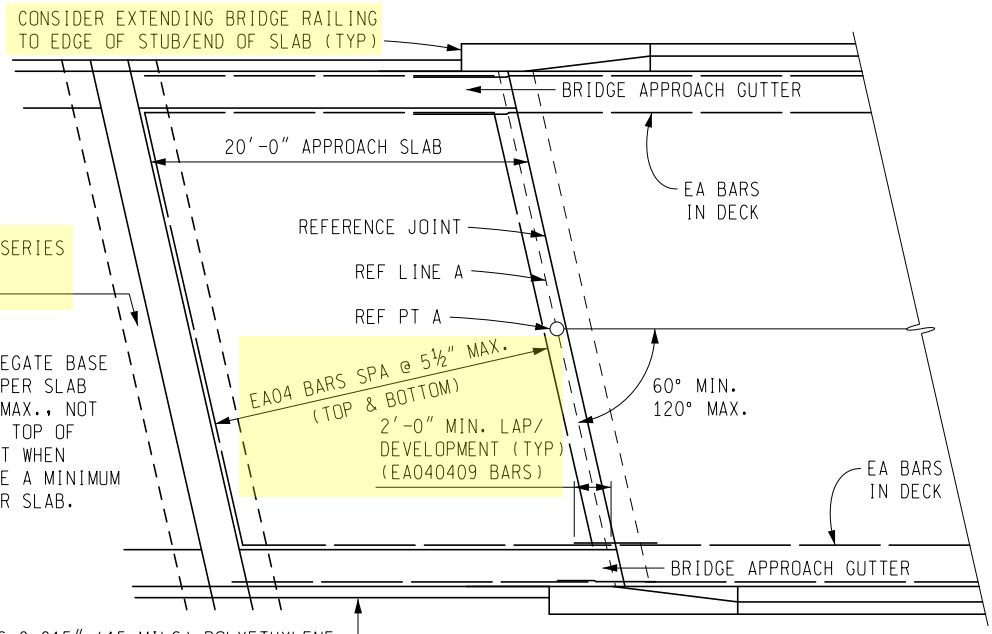
** USE FOR INTEGRAL ABUTMENT BRIDGES ONLY.

SEMI-INTEGRAL ABUTMENTS SHOULD BE USED AT STREAM CROSSINGS.

D = BACKWALL THICKNESS. SEE GUIDE 6.20.01 FOR DEFINITION.

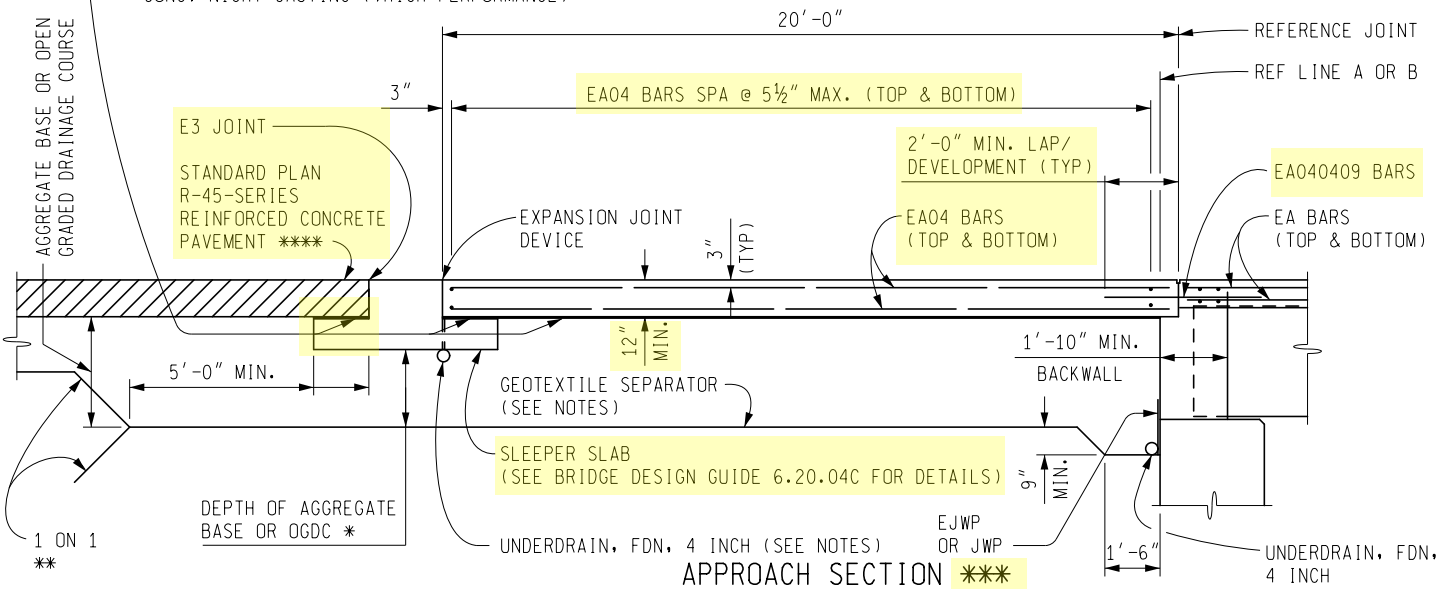
PREPARED BY DESIGN DIVISION	6.20.04

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT INTEGRAL AND SEMI-INTEGRAL ABUTMENT EMPIRICAL APPROACH SLAB DETAILS	ISSUED: 01/24/22 SUPERSEDES: 10/25/21



TWO LAYERS 0.015" (15 MILS) POLYETHYLENE BOND BREAKER (WITH 6" SHEETS OVERLAP) ON STEEL TROWEL FINISH. EXTEND FROM STUB TO 2" ONTO BACKWALL AND AT ROAD SIDE OF SLEEPER SLAB WITH CONCRETE PAVEMENT. INCLUDED IN BID ITEM "SUPERSTRUCTURE CONC, NIGHT CASTING (,HIGH PERFORMANCE)"

PLAN OF APPROACH ***



APPROACH SECTION ***

NOTES:

ATTACH APPROACH CURB AND GUTTER TO THE APPROACH SLAB WITH BOTTOM MAT TRANSVERSE REINFORCEMENT AND TO THE BRIDGE DECK WITH BOTTOM MAT LONGITUDINAL REINFORCEMENT.

POUR APPROACH SLABS FROM EXPANSION LOCATION TOWARD REFERENCE JOINT.

CAST APPROACH SLABS AT NIGHT WITH NIGHT TIME CASTING OF SUPERSTRUCTURE CONCRETE.

USE GEOTEXTILE SEPARATOR ONLY WITH OPEN GRADED DRAINAGE COURSE.

OMIT UNDERDRAIN UNDER SLEEPER SLAB IF OPEN GRADED DRAINAGE COURSE IS USED INSTEAD OF AGGREGATE BASE.

EMPIRICAL APPROACH SLABS (AS DETAILED ON THIS GUIDE) ARE NOT REQUIRED AT THE ENDS OF BRIDGES WITH A LENGTH CONTRIBUTING TO EXPANSION OF LESS THAN 50' FOR CONCRETE BEAM BRIDGES AND LESS THAN 25' FOR STEEL BEAM BRIDGES. INSTEAD, USE A PAVEMENT SEAT WITH STANDARD PLAN R-45-SERIES REINFORCED CONCRETE PAVEMENT.

** SEE GUIDE 5.46.01 FOR TERMINATION LIMITS OF AGGREGATE BASE OR OPEN GRADED DRAINAGE COURSE.

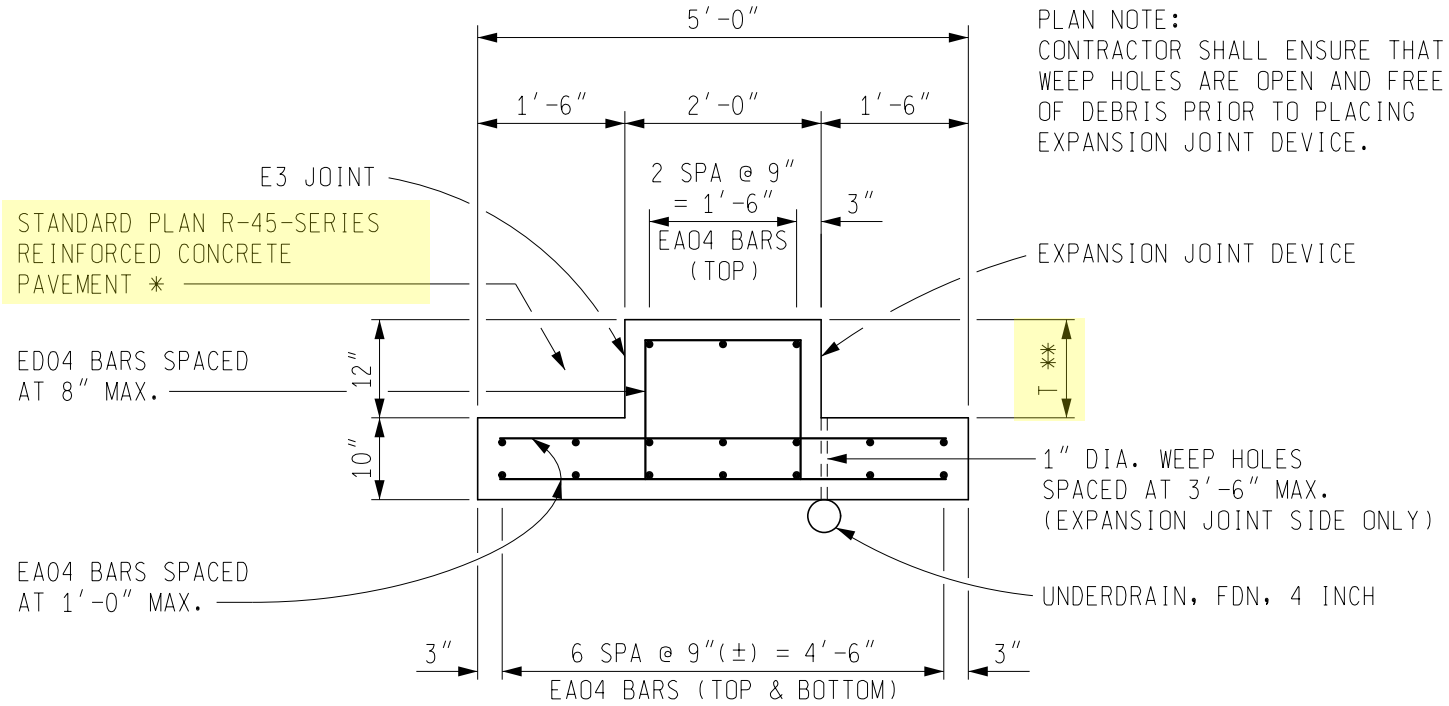
*** THE DETAILED BRIDGE APPROACH SLAB IS BASED ON A LONGITUDINAL UNSUPPORTED LENGTH OF 10 FEET MEASURED ALONG THE CENTERLINE OF THE ROADWAY, A SLAB THICKNESS OF 12" AND A MAXIMUM CONCRETE COVER TO THE CENTERLINE OF THE BOTTOM LONGITUDINAL REINFORCEMENT OF 3". DEVIATION FROM THESE DESIGN PARAMETERS FOR SPECIFIC PROJECTS REQUIRES A COMPLETE REDESIGN OF THE BRIDGE APPROACH SLAB.

**** USE INVERTED "T" SLEEPER SLAB FOR CONCRETE AND HMA ROAD APPROACH PAVEMENT. PLACE STANDARD PLAN R-45-SERIES REINFORCED CONCRETE PAVEMENT THEN CONCRETE OR HMA ROAD APPROACH PAVEMENT.

PLAN NOTE:
DO NOT USE WHEELED, ROLLER BASED OR MACHINE MOUNTED COMPACTION EQUIPMENT TO COMPACT THE SUBGRADE, SUBBASE, AND BASE WITHIN 10' OF THE SLEEPER SLAB AFTER IT IS BUILT. USE ONLY HAND/PLATE COMPACTORS. CONTACT PRESSURE OF COMPACTION EQUIPMENT SHALL NOT EXCEED 10 PSI.

PREPARED BY DESIGN DIVISION	6.20.04B

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT INTEGRAL AND SEMI-INTEGRAL ABUTMENT SLEEPER SLAB DETAILS	ISSUED: 01/24/22 SUPERSEDES: 02/18/14



PLAN NOTE:
CONTRACTOR SHALL ENSURE THAT WEEP HOLES ARE OPEN AND FREE OF DEBRIS PRIOR TO PLACING EXPANSION JOINT DEVICE.

TYPICAL SECTION THRU SLEEPER SLAB

NOTES:
OMIT UNDERDRAIN UNDER SLEEPER SLAB IF OPEN GRADED DRAINAGE COURSE IS USED INSTEAD OF AGGREGATE BASE.

* USE STANDARD PLAN R-45-SERIES REINFORCED CONCRETE PAVEMENT WITH CONCRETE AND HMA ROAD APPROACHES. SEE STANDARD PLAN R-43-SERIES FOR TRANSVERSE JOINT LOCATIONS.

** T = APPROACH SLAB THICKNESS.
12″ MINIMUM FOR DEPENDENT BACKWALL.
9″ MINIMUM FOR INDEPENDENT BACKWALL.